

## ABSTRACT

The optical signal multiplexer/demultiplexer of the invention is characterized by incorporating a bidirectional optical transceiver which is capable of using individual channels working in a transmitting and receiving modes simultaneously. The device consists of a number of optical prisms combined into a single module and provided with appropriate dichroic mirrors and interferometric filters located on the outer surfaces of the prisms. According to one embodiment of the invention, the module consists of two sequentially arranged parallelogram prisms, a single-channel signal input/output unit with an optical collimator/focusator on one side of the prism module and a two-channel signal output/input unit with a respective optical collimator/focusator on the other side of the prism module. The first prism, which is located on the single-channel side has a first antireflective coating transparent to all input/output signals ( $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$ ) and a second coating located on the two-channel side of the first prism that reflects one optical signal ( $\lambda_2$ ) and passes the remaining two optical signals ( $\lambda_1$  and  $\lambda_3$ ). Thus, the input/output signals of several different wavelengths can be multiplexed/demultiplexed while passing in a multi-bounce zigzag expanded beam light paths in various combinations of signal-propagation directions. A pair of prism modules described above may be built-into a section of the main signal transmission/reception line and the output side of each prism module may be connected to a respective bidirectional optical signal transceiver.